Claims

1. A recombinant RNA molecule which can be translated at least partly in a target cell, comprising a noninfectious virus genome of Coxsackie virus group B, preferably serotype B3, and at least one foreign gene which causes a desired function in the target cell, for example within the framework of a gene therapy.

2. The RNA molecule of claim 1, characterized in that it is replication-competent in the target cell.

3. The RNA molecule of claim 1 or 2, characterized in that in the virus genome parts of its coding sequence have been replaced by the at least one foreign gene.

4. The RNA molecule of claim 3, characterized in that in the virus genome the sequences of its capsid proteins VP1-VP4 have been replaced.

5. The RNA molecule of claim 3 or 4, characterized in that in the virus genome the sequences of its protease 2A and/or 3C have been replaced or modified such that there is no cytotoxicity for the target cell.

6. The RNA molecule of any of claims 3 to 5, characterized in that in the virus genome the sequences of its helicase 2C have been replaced.

7. The RNA molecule of any of claims 3 to 6, characterized in that in the virus genome the sequences of its protein 2B have been replaced.

8. The use of the RNA molecule of any of claims 1 to 7 for generating a vector for gene therapy.

9. A recombinant, infectious virion which is derived from Coxsackie Virus group B, preferably serotype B3, and whose genome is the RNA molecule of any of claims 1 to 7.

10. The virion of claim 9, characterized in that it corresponds in its structural proteins to a Coxsackie virus group B, preferably serotype B3.

11. A method for transducing a foreign gene into a target cell, comprising the steps

- providing an RNA molecule of any of claims 1 to 7 or a virion of claim 9 or 10, and

- infecting the target cell with the virion or transferring the RNA molecule by transfection.

12. A vector plasmid having at least one DNA sequence which codes for the RNA molecule of any of claims 1 to 7 and having a promoter located in front of the DNA sequence.

13. A helper construct for complementing the coding sequences replaced in the RNA molecule of any of claims 1 to 7.

14. The helper construct of claim 13, characterized in that it is a helper plasmid which codes for at least one of the replaced sequences in a translatable manner.

15. The helper construct of claim 13, characterized in that it is a viral vector which codes for at least one of the replaced sequences in a translatable manner.

16. The helper construct of claim 13, characterized in that it is a helper cell which has been transfected stably with helper DNA coding for at least one of the replaced sequences.

17. A method for generating the virion of claim 9 or 10, comprising the steps:

- transfecting of host cells with the vector plasmid of claim 12, and

- complementing the replaced sequences in the host cell by the helper construct of any of claims 13 to 15.

18. The method of claim 17, characterized in that the host cell is the helper cell of claim 16.

19. A method for generating the vector plasmid of claim 12, comprising the steps

a) providing a cDNA coding for infectious Coxsackie Viruses subgroup B, preferably subgroup B3,

b) cloning the cDNA into a plasmid in a transcribable manner,

c) amplifying sequence sections of the plasmid with the aid of primers leading to an amplificate which codes for the noninfectious virus genome, and

d) ligating the amplificate to a DNA sequence for the foreign gene.

20. A method of generating the helper construct of any of claims 13 to 16, comprising the steps:

a) providing a cDNA coding for infectious Coxsackie viruses subgroup B, preferably B3,

b) cloning the cDNA into a plasmid in a transcribable manner, and

c) amplifying sequence sections of the plasmid with the aid of primers leading to an amplificate which codes for the replaced coding sequences.

21. A kit, with the vector plasmid of claim 13 and a helper construct of any of claims 13 to 16.

22. A DNA molecule having at least one sequence section coding for the RNA molecule of any of claims 1 to 7.

23. A kit with a DNA molecule of claim 22.

24. A kit for carrying out the method of claim 19 or 20, with

- a plasmid containing cloned cDNA for infectious Coxsackie Viruses subgroup B, preferably subgroup B3, and

- the primers required for amplification.

25. A therapeutic composition with the RNA molecule of any of claims 1 to 7.

26. A therapeutic composition with the vector plasmid of claim 12.

27. A therapeutic composition with virions of claim 9 or claim 10.

28. A DNA construct which codes for an RNA molecule of any of claims 1 to 7 and which persists and transcribes in a target cell but preferably does not replicate in the latter.

29. A recombinant virus, preferably adeno- or retrovirus, which codes for a recombinant RNA molecule of any of claims 1 to 7 and, after infection, expresses it in a

target cell, leading to a cytoplasmic replicon which is produced continuously.

30. A therapeutic composition with a virus of claim 29.

31. The use of the RNA molecule of any of claims 1 to 7 or of the virion of claim 9 or 10 for generating recombinant viruses or virions, preferably having a DNA genome, the foreign gene coding for gene functions lacking in the DNA genome.

32. A method for generating recombinant DNA viruses or DNA virions whose DNA genome lacks particular gene functions, in which method the missing gene functions are provided via a recombinant vector system with RNA genome.